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Category: weather and operational applications

	Name	Abstract Title	Accepted Abstract Format	Abstract
1.	Bill Blackwell *MIT Lincoln Laboratory*	NPP Advanced Technology Microwave Sounder (ATMS): Sensor description and preliminary data product performance	Poster	A suite of sensors scheduled to fly onboard the NPOESS Preparatory Project (NPP) satellite in 2011 will both continue and improve the environmental data records provided by operational and research missions over the last 40 years. The Cross-track Infrared and Microwave Sounding Suite (CrIMSS), consisting of the Cross-track Infrared Sounder (CrIS) and the first space-based, Nyquist-sampled cross-track microwave sounder, the Advanced Technology Microwave Sounder (ATMS), will provide atmospheric vertical profile information needed to improve numerical weather and climate modeling. The ability of ATMS to sense temperature and moisture profile information in the presence of non-precipitating clouds complements the high vertical resolution of CrIS. Furthermore, the ability of ATMS to sense scattering of cold cosmic background radiance from the tops of precipitating clouds allows the retrieval of precipitation intensities with useful accuracies over most surface conditions. This paper will present several assessments of the performance of ATMS and the geophysical quantities that are to be derived using ATMS measurements. Pre-launch testing of ATMS has characterized the principal calibration parameters and has enabled predictions of on-orbit performance with high levels of confidence. Planned on-orbit characterization of ATMS will further improve both the measurement quality and the understanding of various error contributions. This paper is organized as follows. First, an overview will be given of the prelaunch radiometric calibration of ATMS. Key calibration parameters will be discussed, as well as the error bars and dominant sources of uncertainty. Second, plans for on-orbit characterization of ATMS to further improve performance and reduce uncertainty will be presented. Finally, preliminary assessments of ATMS data product performance will be discussed, including vertical profile and precipitation products.

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2.	Ms. Lauren M Candlish *Centre for Earth Observation Science, University of Manitoba*	On the use of CloudSat and Calipso to study clouds over sea ice in the Southern Beaufort Sea.	Talk	Average atmospheric conditions in the Arctic are often close to algorithmic boundary conditions of many commonly used GCM's, and can cause inaccurate results. A lack of data for atmospheric modeling in the Arctic limits the validity of model output; atmospheric models require field validation. This presentation entails a comparison of two satellites CloudSat and CALIPSO, with empirical data collected during the Circumpolar Flaw Lead System Study (CFL) and the ArcticNet Cruise 2009 in the Western Canadian High Arctic over sea ice. Satellite-derived parameterizations of Arctic atmospheric conditions at large spatio-temporal scales include surface/cloud temperature, atmospheric temperature, and cloud properties. CloudSat's 94-Ghz cloud profiling radar (CPR) and CALIPSO (Cloud-Aerosol Lidar and Infrared Pathfinder Satellite Observation)'s 532-nm and 1064-nm Cloud-Aerosol Lidar with Orthogonal Polarization (CALIOP) lidar are the first satellites with the capability to vertically profile the structure of Arctic clouds. The combined radar-lidar cloud detection technique relies on the backscattered energy from the cloud particles. The weak thermal and albedo contrasts between clouds and the ice-covered Arctic surface make other cloud detection techniques insufficient in the Arctic due to their reliance on passive radiances. Validation data including manual observations for cloud fractional coverage, vapor density, and lapse rates from radiosondes, and a ground based microwave vertical profiler are used to quantify forcing mechanisms at seasonal time scales. In-situ atmospheric data continuously collected over the period of November 2007 to August 2008 and July 2009 to November 2009 is categorized to validate CloudSat and CALIPSO data products. The ancillary data product, ECMWF, has been examined and compared with temperature and vapor density profiles from radiosondes and our ground based vertical microwave profiler. Seasonal trend analysis has been performed on CALIPSO's cloud base height data product (CALIPSO Lidar Level 2 1/3 km cloud layer data) and compared with the ceilometer data for low/mid level clouds. The comprehensive collection of field observations and remote sensing analysis provides an accuracy assessment for CloudSat's and CALIPSO's data products in the High Arctic.

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3.	Dr. Simon A Carn *Michigan Technological University*	New perspectives on volcanic clouds from the A-Train	Talk	A-Train observations of volcanic clouds and plumes are a prime example of the scientific value and operational applications of synchronized passive and active measurements from multiple satellite instruments. Volcanic eruption clouds are ephemeral, dynamic suspensions of particles in volcanic gases and entrained ambient air, analogous in some ways to convective meteorological clouds. Volcanic cloud constituents include gases (including water vapor, CO2, SO2, HCl), volcanic ash (fragmented silicate magma), hydrometeors (raindrops, snow, hail, graupel, sleet), and particles that are mixtures or agglomerations of all the above. Volcanic ash is a major hazard to jet aircraft at cruising altitudes, and was responsible for worldwide economic impacts following the eruption of Eyjafjallajökull (Iceland) in April 2010. Quantification and tracking of volcanic emissions are therefore critical for aviation hazard mitigation and for accurate appraisal of natural climate forcing. With the advent of the A-Train, synoptic satellite imaging of volcanic eruption clouds has been augmented by vertically-resolved measurements of volcanic plume constituents at altitudes from the planetary boundary layer (PBL) to the stratosphere. In particular, the availability of space-borne lidar and radar observations from CALIPSO and CloudSat has been a major advance for studies of explosive volcanism. Vertical profiles through fresh, aerosol-laden volcanic clouds from CALIPSO have revealed their internal structure for the first time and provide direct measurements of plume-top altitude, a key parameter when estimating mass flux during explosive eruptions and for validation of trace gas retrieval algorithms. Ash mass loading retrievals from other A-Train sensors (e.g., Aqua-AIRS and Aqua-MODIS) can be combined with coincident CALIPSO data to derive ash concentrations in volcanic clouds. These measurements offer improved parameterization and validation for models of eruption column dynamics and particle dispersion that are used to forecast volcanic cloud hazards. The Eyjafjallajökull crisis emphasized the need for accurate, operational determination of ash cloud altitude and vertical extent, and ash concentrations to enable aircraft to avoid airspace occupied by hazardous ash clouds. Mapping of volcanic SO2 emissions is also vital for volcano monitoring, eruption detection and volcanic cloud tracking. Coordinated SO2 measurements by four A-Train instruments with different vertical sensitivity and spatial resolution (Aura-OMI, Aqua-AIRS, Aqua-MODIS and Aura-MLS) are providing new information on the altitude, magnitude and lifetime of volcanic SO2 emissions. Current challenges for operational application of A-Train observations to volcanic hazard mitigation include data latency for some satellite data products, the poor spatial coverage of the active sensors and the development of visualization tools to ingest and display multiple datasets. In this presentation we will illustrate some of the discoveries enabled by A-Train data and their operational applications using examples from recent volcanic eruptions including Chaitén (Chile), Okmok (Aleutian Islands), Kasatochi (Aleutian Islands), Redoubt (Alaska), Sarychev Peak (Kurile Islands) and Eyjafjallajökull.
4.	Dr. Allen Chu *GEST*	Interpretation of 3-D Aerosol Measurements for Air Quality Study	Poster	Aerosol vertical distribution plays an important role in estimating surface particulate matter with aerosol optical depth from remote sensing measurements. This presentation include baseline study using surface AERONET and MPLNet measurements and characterization of aerosol vertical distribution within boundary layer. Also includes are comparison of MODIS-derived AOD with baselined results.

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5.	Dr. Sabatino Di Michele *European Centre for Medium-Range Weather Forecasts (ECMWF)*	Use of cloud radar and lidar data for model validation and assimilation at ECMWF	Poster	With the introduction of the Cloud-Aerosol Lidar and Infrared Pathfinder Satellite Observation (CALIPSO) and CloudSat, we have entered a new era for cloud observation. For the first time, a large volume of information on the vertical structure of clouds covering all climate regimes has become available. These new observations are of great potential value to the numerical weather forecasting (NWP) community for model evaluation, further model development and in the context of data assimilation. Research activities are underway at the European Centre for Medium-Range Weather Forecasts (ECMWF) to make maximum use of these data, also in synergy with the other instruments part of the A-Train. In this work, results from the ongoing studies will be presented, as summarized in the following points. • Use of CloudSat and CALIPSO for verification studies of cloud and precipitation fields of the ECMWF forecast model. • Use of CALIPSO to validate the cloud detection algorithm used in the ECMWF data assimilation system for the Atmospheric Infrared Sounder (AIRS) • Use of CALIPSO to validate the height assignment (HA) for Atmospheric Motion Vectors (AMVs) derived from geostationary cloudy radiances. • Use of CloudSat products to validate the assimilation in cloudy regions of radiances from the Advanced Microwave Scanning Radiometer for the Earth Observing System (AMSR-E). • Development of a method for estimating the representativity error due to the narrow swath of the active satellite measurements. • Data assimilation of CloudSat observations using a 1D+4D-Var approach.
6.	Mr. Takumu Egawa *Japan Meteorological Agency*	The Use of AMSR-E at JMA	Talk	The Japan Meteorological Agency (JMA) uses Aqua/AMSR-E data in its data assimilation systems for the numerical weather prediction. They are indispensable to the accuracy of prediction. The merit of AMSR-E data is to obtain information on water vapor in the lower troposphere over the sea where other observations are lacked. In the JMA meso-scale model, total column water vapor retrievals are assimilated in clear or thin-cloudy areas, and precipitation retrievals are assimilated in rainy areas. In the global spectral model, clear radiances of vertically polarizes channels are assimilated. Making use of AMSE-E data brought improvement of the water vapor analysis and the tropical cyclone prediction.

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7.	Janna Feeley *Aerospace*	NPOESS Preparatory Project Validation Program for Land Data Products from the Visible Infrared Imager Radiometer Suite (VIIRS)	Poster	The Joint Polar Satellite System (JPSS) Program, in partnership with National Aeronautical Space Administration (NASA), will launch the NPOESS Preparatory Project (NPP), a risk reduction and data continuity mission, prior to the first operational JPSS launch. The NOAA/NESDIS Center for Satellite Applications and Research (STAR) will execute the NPP Validation program in collaboration with subject matter experts from the user communities to ensure the data products comply with the requirements of the sponsoring agencies. Data from the NPP Visible/Infrared Imager/Radiometer Suite (VIIRS) will be used to produce Environmental Data Records (EDR's) for land, specifically Snow Cover/Depth, Land Surface Temperature, Vegetation Index, Albedo (surface), Ice Surface Temperature, and Sea Ice Characterization. The Land Validation Program is a multifaceted effort to characterize and validate these data products. The program involves systematic comparison to heritage data products, e.g., MODIS, and ground-based correlative data, such as DOE ARM, Fluxnet, and other similar data products. The program leverages various investments that have and are continuing to be made by national funding agencies in such resources, as well as the operational user community and the broad Earth science user community. This presentation will highlight pre-launch activities and provide an overview of the approaches, data and schedule for the validation of the NPP VIIRS Land environmental data products.
8.	Janna Feeley *Aerospace*	NPOESS Preparatory Project Validation Program for the Imagery and Cloud Mask Data Products from the Visible/Infrared Imager/Radiometer Suite	Poster	The Joint Polar Satellite System (JPSS) Program, in partnership with National Aeronautical Space Administration (NASA), will launch the NPOESS Preparatory Project (NPP), a risk reduction and data continuity mission, prior to the first operational NPOESS launch. The NOAA/NESDIS Center for Satellite Applications and Research (STAR) will execute the NPP Validation program in collaboration with subject matter experts from the user communities to ensure the data products comply with the requirements of the sponsoring agencies. The Imagery and VIIRS Cloud Mask (VCM) plans incorporate a combination of real-time users, scientists, and climate specialists to insure a viable and effective set of products. The Imagery team includes subject matter experts and organizations representative of all aspects of imagery application, from clouds to sea ice to aerosols along with ground/ocean features of meteorological interest. The VCM plan considers not only the VCM as a single product, but extensive evaluation regarding its impacts on all downstream VIIRS products. Both leakage and false alarms are accounted for, and users for both the confidently cloudy and confidently clear output are included as part of the evaluation team. Evaluation tools for the VCM include the capability to display each cloud detection test, match ups between the VCM with CloudSat, CALIPSO, and MODIS, quantitative comparisons between the VCM and manual analysis produced by subject matter experts, and statistical impacts on dependent Environmental Data Products such as SST and surface reflectance. This comprehensive approach will allow all dependent users to obtain a reliable measure of the capabilities of the Imagery and VCM. This presentation will highlight pre-launch activities and provide an overview of the approaches, data and schedule for the validation of the NPP VIIRS Imagery and Cloud Mask data products.

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9.	Dr. Bruce Guenther *JPSS - NOAA*	Continuity of the A-Train MODIS Observations: Welcome to the NPP VIIRS	Poster	The Visible-Infrared Imaging Radiometer Suite (VIIRS) is a keystone sensor on the NPOESS Preparatory Program (NPP) satellite mission. The NPP satellite is fully populated with sensors and will enter Observatory thermal vacuum testing in the Spring, 2011, at the Ball Aerospace Technology Corporation, Boulder, CO. The VIIRS is built by the Raytheon Corporation, and is the second generation US moderate-resolution imaging radiometer. The first generation moderate-resolution imaging radiometer is the Moderate Resolution Imaging Radiometer System (MODIS) that is in space at both the Earth-Observing System (EOS) AM-Terra and PM-Aqua spacecraft. MODIS also was built by the Raytheon Corporation, and the MODIS-Aqua sensor is a primary instrument in the NASA A-Train constellation. This poster will introduce the attributes of the VIIRS sensor and present comparisons of VIIRS ground test performance with the ground and on-orbit MODIS Aqua performance. The most significant differences between VIIRS and MODIS will be shown. VIIRS has fewer bands (22) than does MODIS (36), but also carries 8 dual gain bands, allowing the same bands to serve both ocean and land needs. The VIIRS does not have a fluorescence band for ocean color, and carries fewer bands in the 0.4 to 1.0 μm spectral range than are on the MODIS band set. The shortwave and midwave infrared band sets are similar. The long wave measurement set for VIIRS does not have any measurements beyond 12 μm. Most of the VIRSS bandpasses are about twice as wide as the similar bands on MODIS, but they have similar spectral out of band characteristics. (See accompanying poster by Moeller, et. al. for details on performance of the spectral bands.) The VIIRS also has 5 imaging bands with still lower spectral resolution but higher (2X) spatial resolution. (with twice the resolution as the moderate resolution bands) ranging across the full spectral range. The orbit is higher than the Aqua A-Train orbit (see accompanying poster by Murphy, et. al.) VIIRS has a finer spatial resolution with an aggregated resolution of about 750m X 750m at Nadir for the moderate resolution bands & 375m X 375m for the imaging bands. The VIIRS swath is wider than MODIS, yielding complete global coverage in one day. The edge of scan pixel size growth is 1/6th the growth of the MODIS pixels due to an aggregation scheme and a “native” pixel size that is 1/3rd the field of view at Nadir. VIIRS moderation resolution bands have 16 detectors in the track direction, compared to the MODIS design which has 10 detectors in track for the moderate resolution bands. The VIIRS polarization sensitivity is approximately similar to the MODIS sensitivity below 1.0 μm, and may have a somewhat better performance uncertainty knowledge than was known for Aqua-MODIS at launch. Overall the VIIRS noise characteristics are somewhat worse than the Aqua MODIS characteristics on individual measurements in the L1B product (called the Sensor Data Record in JPSS program) and VIIRS has a somewhat better noise performance than MODIS for observations normalized by surface area of observation. Both sensors have the potential of scan angle effects due to common use of wisk-broom scanning design. The Spectro-Radiometric Calibration Assembly that is present on MODIS has been deleted from VIIRS for the suite of on-board calibration devices. The VIIRS solar diffuser (SD) has a “single gain” state with a fixed SD screen. The VIIRS SD screen is fixed and is not covered with a SD aperture cover on-orbit. The VIIRS screen design has been upgraded to provide improved mitigation against earth-shine glint providing contamination of SD observations. The VIIRS doors (cooler and earth view)

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10.	Dr. Thomas J Hearty III *GSFC/Wyle*	The AIRS Near Real Time (NRT) Data Products	Poster	Most AIRS Near Real Time (NRT) data products are available in less than 3 hours while the routine products are typically available after ~ 24 hours. Our investigation of a year of processing shows that more than 95% of the NRT granules were available in less than 3 hours. The rapid availability of AIRS NRT products makes them well suited for applications such as weather forecasting and monitoring natural hazards. While in many cases the AIRS NRT products are nearly as good as the routine products it is important for users to understand how they differ. Therefore we examine differences between the AIRS NRT and routine processing in terms of latency, geolocation, radiometry, and retrieval accuracy.
11.	Mr. Ming Hou *Agriculture and Agri-Food Canada*	Assessing the Risk of Desertification with Multi-Sensor and Multi-Temporal EOS Data	Poster	The aim of this study was to integrate multi-sensor and multi-temporal remote sensing images from earth observation satellites over land surfaces in the arid region of east Asian to assess the risk of desertification. The multi-sensor images include the new released Level-3 surface soil moisture products of Advanced Microwave Scanning Radiometer-EOS (AMSR-E), land products of Moderate-resolution Imaging Spectroradiometer (MODIS) and SPOT-4. Time series data-sets from 2002 to 2007 are collected, batch-processed and analyzed in ENVI platform. The ASTER Global Digital Elevation Model (GDEM) and land use classification data were employed to reduce the influence of large-scale topography and uncorrelated surface features in the inland arid region. A new index for rapid risk assessment of desertification was constructed and calculated month by month, and the preliminary assessment result was compared by area with the result of 3rd desertification general investigation conducted in China, 2004. The results of the initial analysis have shown different accuracy in various regions based on a five hundred meters grid. It also indicates that the new index has good potential for rapid assessment of desertification risk in the inland arid region of East Asian.

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12.	Prof. Anthony J Illingworth *University of Reading*	Cloud liquid water path and drizzle as observed by the A-train and their representation in operational forecast models.	Talk	A novel technique for the retrieval of liquid water path (LWP) using the attenuation of the CloudSat ocean surface backscatter, using clear sky pixels identified with the CALIPSO lidar as a calibration reference, is presented. This retrieval, which can be applied both day and night, agrees with MODIS daytime retrievals of LWP to within 20%. The retrieved LWP values are used to simulate adiabatic profiles of radar reflectivity due to cloud liquid water content. These profiles are subtracted from the observed reflectivity to estimate the reflectivity due to drizzle, and thus the drizzle rate. Drizzle rates were found to increase with LWP, with 60-80% of clouds drizzling at a rate exceeding 0.004 mm hr-1, equivalent to a heating rate of 3 W m-2, at an LWP of 250 gm-2. Observed drizzle rates were compared to drizzle rates in the Met Office and ECMWF global models. It was found that both models produce excessive heavy drizzle, with over 70% of clouds with in-cloud LWP = 250 gm-2 in both the ECMWF and Met Office models drizzling at a rate exceeding 0.1 mm hr-1, equivalent to a heating rate of 70 Wm-2, whereas less than 5% of observed clouds with the same in-cloud LWP exceeded this rate. A simple forward model was used to simulate radar reflectivity from ECMWF rainflux. Decreasing the rate of autoconversion, or increasing the critical water content in the ECMWF large-scale precipitation scheme, led to simulated reflectivity values consistent with observations. The CALIPSO lidar was used to estimate cloud-base and thus the dilution of observed clouds with respect to an adiabatic profile. For LWP = 50 gm-2, a mean dilution factor of 0.18 was observed, in contrast to a dilution factor of 0.32 in the ECMWF model. This suggests that ECMWF model cloud profiles are insufficiently subadiabatic, which cloud lead to excessive cloud-top liquid water content, and thus excessive heavy drizzle.
13.	Mrs. Almaz Tadesse T Jifar III *weather and satellite*	The comparative analysis of RFE, NDVI, Gauge observation and moisture status for Agro-Meteorological Impact Assessment for Kiremt 2008	Poster	Ethiopia experiences three rainfall seasons. Locally called Kiremt, from (June to September Belg, (Feb- May), Bega (October- January). During Kiremt season Most parts of the country received sufficient rainfall with the exception of south and southeastern tip of the country Moreover, this season fulfill the water requirement of long cycle crops that are planted in the months of April-May and Meher crops that achieve maturity during the Bega season. Rainfall data is very important input for drought monitoring. It is very crucial especially in the country like Ethiopia which is entirely depends on the rain fed agriculture. Rainfall data is obtained from gauge station. In Ethiopia the distribution of rain gauge station is very sparse and it is not uniform. There are also remote areas with no station at all. Only few station report on regular basis. One of the possible sources of drought monitoring is remote sensing. So that the Nma has been using data from meteorological sattelite for over a dkad. Metosat data is used for RFE the NOAA sattelite is being used for vegetation monitoring. Since, these two out put whose content are rainfall and vegetation assessment for the entire country based on the satelite data, I used NDVI, RFE and the gauge observation on from Metosat on Dekad basis and moisture statues on monthly basis to prepare the agro meteorological impact assessment for Kiremt 2008 .

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14.	Mrs. ANGELITA C KELLY *NASA Goddard Space Flight Center*	The International Afternoon Constellation (A-Train) Mission Operations Working Group (MOWG)	Poster	This poster describes the work of the A-Train MOWG to support and enable concurrent science from the various satellites in the A-Train. The MOWG is composed of representatives from the various A-Train operations teams, both current and future, with oversight from agency management and Mission/Project Scientists,. The MOWG is concerned with ensuring the safety of the A-Train satellites while providing the maximum science return. This poster includes the MOWG's goals and objectives, coordination guidelines and processes, monitoring and warning system, configuration control process, debris monitoring process, conflict resolution process, and contingency procedures. The process for adding new missions is also included.
15.	Heather Kilcoyne *NOAA*	NPOESS Preparatory Project Validation Program for Atmosphere Data Products from the Visible Infrared Imager Radiometer Suite (VIIRS)"	Poster	The Joint Polar Satellite System (JPSS) Program, in partnership with National Aeronautical Space Administration (NASA), will launch the NPOESS Preparatory Project (NPP), a risk reduction and data continuity mission, prior to the first operational JPSS launch. The NOAA/NESDIS Center for Satellite Applications and Research (STAR) will execute the NPP Validation program in collaboration with subject matter experts from the user communities to ensure the data products comply with the requirements of the sponsoring agencies. Data from the NPP Visible/Infrared Imager/Radiometer Suite (VIIRS) will be used to produce Environmental Data Records (EDR's) for aerosol and clouds, specifically Aerosol Optical Thickness (AOT), Aerosol Particle Size Parameter (APSP), and Suspended Matter (SM); and Cloud Optical Thickness (COT), Cloud Effective Particle Size (CEPS), Cloud Top Temperature (CTT), Height (CTH) and Pressure (CTP), and Cloud Base Height (CBH). The Aerosol and Cloud EDR Validation Program is a multifaceted effort to characterize and validate these data products. The program involves systematic comparison to heritage data products, e.g., MODIS, and ground-based correlative data, such as AERONET and ARM data products, and potentially airborne field measurements. To the extent possible, the domain is global. The program leverages various investments that have and are continuing to be made by national funding agencies in such resources, as well as the operational user community and the broad Earth science user community. This presentation will highlight pre-launch activities and provide an overview of the approaches, data and schedule for the validation of the NPP VIIRS Aerosol and Cloud environmental data products.

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16.	Heather Kilcoyne *NOAA*	NPOESS Preparatory Project Validation Program for the Ozone Mapping and Profiler Suite	Poster	The Joint Polar Satellite System (JPSS) Program, in partnership with National Aeronautical Space Administration (NASA), will launch the NPOESS Preparatory Project (NPP), a risk reduction and data continuity mission, prior to the first operational JPSS launch. The NOAA/NESDIS Center for Satellite Applications and Research (STAR) will execute the NPP Validation program in collaboration with subject matter experts from the user communities to ensure the data products comply with the requirements of the sponsoring agencies. The Ozone Mapping and Profiler Suite (OMPS) consists of two telescopes feeding three detectors measuring solar radiance scattered by the Earth's atmosphere and solar irradiance by using diffusers. The measurements are used to generate estimates of total column ozone and vertical ozone profiles. The validation efforts will make use of external resources in the form of ground-based and satellite measurements for comparisons, and internal consistency methods developed for backscattered ultraviolet measurements over the last thirty years. This presentation will provide an overview of the comparative data, analysis techniques, and collaborative teamwork for the validation of the NPP ozone environmental data products.
17.	Prof. Jhoon Kim *Yonsei University*	Effects of Copper Smelter Modernization on Air Quality in Ilo, Peru as Captured by MISR, MODIS and OMI	Talk	The modernization of a copper smelter in Ilo, Peru, which was completed in January 2007 has been found to change the local aerosol loading in MISR and MODIS AOD(aerosol optical depth) measurements, and in OMI SO2 measurements. Although monitoring of these regional pictures is not available with the existing surface network, changes of AODs before and after the modernization were clearly evident in satellite-derived AODs and SO2 concentrations. Data from MISR shows that the average AOD decreased from 0.35 before January 2007 to 0.27 after January 2007, while MODIS values decreased from 0.35 to 0.23. The average concentration of SO2 decreased from 3.64 DU to 1.24 DU as of January 2007. Our analyses demonstrate the capability and value of satellite remote sensing for detecting air quality changes that can be used as a basis for environmental policy making and monitoring.

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18.	Mr. Brian Knosp *Jet Propulsion Laboratory*	Using A-Train Data for Near Real-Time Field Experiment Applications: The JPL GRIP Portal	Poster	In the summer of 2010, NASA will conduct the Genesis and Rapid Intensification Processes (GRIP) field experiment in the Northern Atlantic region. The goal of this field experiment is to study how tropical cyclones form and develop into hurricanes. As a part of this effort, the JPL GRIP Portal was developed to provide GRIP team members with access to near-real time observation and model data to give mission planners a clear picture of current atmospheric and oceanic conditions. The JPL GRIP Portal was developed at the Jet Propulsion Laboratory and uses the Google Earth API to display data maps of atmospheric and oceanic data quantities, many of which come from A-Train instruments. AIRS contributes convective available potential energy (CAPE), lifted index (LI), and relative humidity; MLS contributes temperature, ozone, ice water content, and water vapor 3D curtain plots; CloudSAT contributes vertical profiles of cloud and precipitation (as depicted by the radar backscatter); CALIPSO contributes lidar data; MODIS contributes data that depicts aerosol loading of the atmosphere; AMSR-E contributes microwave brightness temperature and rain index maps. Most data collected for the JPL GRIP Portal are from near-real time data sets that have a 2-5 hour latency. By using this portal, researchers, pilots, and program directors in the field can make timely decisions about flight plans since they can use the portal to look at current conditions and see if there are any signs of tropical cyclones developing. Visualizations on this portal include 2-D maps, 3-D curtain plots, and point maps (for CAPE and LI) that allow the user to zoom in, pan around the North Atlantic, and overlay data sets with each other to gain a more complete understanding of current physical environmental conditions. Data can also be overlaid with different opacity levels to see how multiple processes in of the atmosphere are working together to potentially form a tropical cyclone. Additionally, the JPL GRIP Portal has the ability to animate these A-Train (and other) data sets so users can see how systems have progressed at a daily and/or hourly rate. Observation/model data comparisons are also possible with the JPL GRIP Portal. The portal allows users to compare, for example, AIRS observed relative humidity with a NOGAPS modeled relative humidity. In this way, ground crews and forecasters who are directing the GRIP campaign can see how well the models match the observations, and, if the models match well, GRIP staff can use the models with a higher degree of certainty when using forecasts to develop flight plans. This poster will introduce the A-Train science community to the JPL GRIP Portal and its uses of A-Train data and applications.

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19.	Mr. Christopher C Moeller *University of Wisconsin*	Welcome to the NPP VIIRS: VIIRS Relative Spectral Response from the Government Team	Poster	The Visible-Infrared Imaging Radiometer Suite (VIIRS) has completed spectral characterization testing that included sensor level testing on all bands in summer 2009, and spacecraft level testing on VisNIR bands in spring 2010. The testing includes data collection for characterizing in-band (IB) and out-of-band (OOB) spectral regions. The Government Team (GT), comprised of NASA, Aerospace Corp., and MIT/Lincoln Lab elements, has been responsible for an independent (from that of industry) analysis and review of all aspects of the VIIRS Flight 1 (F1) unit performance. The GT has recently completed a set of "best" relative spectral response (RSR) for VIIRS bands. The GT RSR are based primarily on the sensor level test data but also employ the spacecraft level test data for further insight on F1 VisNIR spectral performance. While the GT RSR are not intended to be used directly in the VIIRS SDR algorithm after launch, they will be compared to the SDR algorithm RSR (produced by industry) in a future effort to gain insight and improve confidence in the F1 RSR characterization. The GT RSR are available (planned release in September 2010) to the interested science community for early assessment of spectral influence on VIIRS Environmental Data Records (EDRs). This poster will introduce the spectral characteristics of VIIRS F1 unit as seen through the GT RSR effort, including description of the GT analysis procedure, display of IB+OOB RSR for all bands, and performance metrics. As the follow-on imaging radiometer to the highly successful Moderate Resolution Imaging Radiometer Spectroradiometer (MODIS) on AM-Terra and PM-Aqua platforms, the GT VIIRS F1 RSR will be compared to MODIS RSR in the poster. Similarities and differences in such characteristics as IB and OOB performance and detector to detector variation will be exhibited. Simulated radiometric comparisons will be provided using a forward model for thermal bands. During the symposium, this poster is intended to provide an in-depth review of VIIRS spectral characteristics in partnership with an introductory poster on VIIRS overall performance titled "Continuity of the A-Train MODIS Observations: Welcome to the NPP VIIRS" (submitted by Guenther et al.).

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20.	Mr. Ahmad Mokhtari *PhD Candidate*	Time Series Analysis of AVHRR data for Monitoring Drought Effects on Land Use/Cover change (Case study Zayandeh-rud basin/Isfahan/Iran).	Poster	This research applied mix implementation of NOAA-AVHRR satellite images and the time series Weather data to investigate temporal Land use/cover changes in compare to Drought periods in a 10 year duration (1992-2003) in one of the most important regions of central Iran which is Zayandeh-rud basin. First, satellite image pre-processing analyses were done and SPI spatial distribution as a base map was prepared by the Weather Stations coordinates. Different spatial interpolation methods are tested and best model was selected based on cross validation table. The best chose model used to create spatiotemporal SPI data set as yearly digital maps. Image processing, then, were done in two steps; statistic step and dynamic step. In the first step of processing, initially MODIS and AVHRR data was correlated to be recognized if the MODIS data in the scale of study can bring about more statistically significant information in compare to AVHRR data. Statistically correlation shows no significant difference between the two sensors, so we used only the AVHRR data to produce the Land use/cover classification. As a novel idea, in this research, we developed a new fast simple multi-seasonal algorithm of AVHRR images, based on the vegetation and crop phonology in the study area to classify the different land use/cover units. Finally, variations of the SPI index for the study period were plotted among the land use/cover area changes. Results showed, although, drought were mostly affected vegetation cover on the Rangelands and spars forests as well as dry-farming areas and had not a clear effect Gardens and irrigated farms which farmers, usually, use ground water resources in the drought periods, but, there is not a statistically significant relationship between the SPI drought index and land use/cover changes at the 90% or higher confidence level.
21.	Dr. Jean-Jacques Morcrette *ECMWF*	Use of A-train data for aerosol validation and assimilation in the ECMWF Integrated Forecast System	Talk	As part of the GEMS (Global and regional Earth-system (Atmosphere) Monitoring using Satellite and in-situ data), now MACC (Monitoring Atmospheric Composition and Climate) project, ECMWF (the European Centre for Medium-Range Weather Forecasts) has been using MODIS total aerosol optical depth as primary information for its analysis of aerosols within the Integrated Forecast System. At the time of the original development of the aerosol forecast system, MODIS data were used for validation together with AERONET surface measurements. CloudSat/CALIPSO aerosol/cloud mask data were then used to validate the vertical distribution of aerosols. Work has also recently started towards the 4D-variational assimilation of both coarse mode and fine mode aerosol optical depths from MODIS and the 1D+4D-Var assimilation of the 532 nm backscattering coefficient from CALIOP. The presentation will illustrate the use of these A-Train data at various stages in the analyses and forecasts.

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	Name	Abstract Title	Accepted Abstract Format	Abstract
22.	Mr. Kevin J Murphy *NASA GSFC*	IMPLEMENTATION OF THE LAND, ATMOSPHERE NEAR REAL-TIME CAPABILITY FOR EOS (LANCE)	Talk	NASA's Earth Observing System Data and Information System (EOSDIS) provides a wealth of data and products supporting scientific research of the atmosphere, oceans, and land. The Earth Observing System (EOS) instruments onboard Terra, Aqua and Aura satellites make global measurements daily which are processed into higher-level "standard" products within 8 to 40 hours of observation and then made available to users, primarily earth science researchers. However applications users, operational agencies, and even researchers desire EOS products in near real-time to support research and applications, including numerical weather and climate prediction and forecasting, monitoring of natural hazards, ecological/invasive species, agriculture, air quality, disaster relief and homeland security. These users often need data much sooner than routine science processing allows, usually within 3 hours, and are willing to trade science product quality for timely access. In response to this need, NASA developed the Land, Atmosphere Near Real-time Capability for EOS (LANCE).
23.	Dr. Robert E Murphy *IPO/Scientia*	Orbit Opportunities for Innovative Cross-Sensor Validation: NPP Over-flying the A-Train	Poster	The NPOESS Preparatory Project (NPP) will be launched into an orbit that over-flies the "A-Train" which includes EOS Aqua, CloudSat, CALIPSO, and EOS Aura. While the A-Train satellites orbit at 705 km, NPP will be at an altitude of 824 km. Both the A-Train and NPP have equator crossing times near 1330. The NPP orbit was chosen to mimic the 16 day ground track repeat pattern that had been used for Landsats 4, 5 & 7, as well as EOS Terra and the A-Train. The particular 16-day repeat has advantages for acquiring cloud-free Landsat scenes, and for optimizing the range of viewing geometry for multi-day land products from EOS Terra and Aqua. NPP requires just 227 revolutions to complete one sequence of ground tracks while satellites in the A-Train require 233 orbits. As a result, NPP will be directly above any given A-Train satellite once every 2.667 days, and there will be a period of about 19 hours out of each 2.667 days (~30% of the time) where NPP is within ±15 minutes of that satellite. Over that period of time the nadir tracks will diverge, offering the opportunity for cross-track comparisons. We will demonstrate some of the opportunities for cross calibration that take advantage of this unique set of orbits. In addition to the capability to acquire near simultaneous measurements as noted above, there are opportunities for similar sensors (e.g. VIIRS on NPP and MODIS on Aqua) to measure geophysical parameters (e.g. sea surface temperature) simultaneously with one sensor viewing the pixel at a scan angle of, say 20° while the other views it in the nadir. This provides the opportunity to examine sensor parameters such as variations in the scan mirror emissivity and perhaps disentangle them from algorithmic or cloud mask errors. In addition, NPP can be used as a transfer standard as it successively over-flies EOS Aqua, CloudSat, CALIPSO, and EOS Aura.

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	Name	Abstract Title	Accepted Abstract Format	Abstract
24.	Ms. Puneeta Naik *Louisiana State University*	Spatial and temporal variability of sea-surface temperature and chlorophyll in the eastern Bering Sea through Empirical Orthogonal Function (EOF) analysis	Poster	Spatial and temporal variability of sea-surface temperature and chlorophyll in the eastern Bering Sea through Empirical Orthogonal Function (EOF) analysis Puneeta Naik, pnaik2@tigers.lsu.edu, Louisiana State University, Baton Rouge, LA-70803 Eurico J. D'Sa, ejdsa@lsu.edu, Louisiana State University, Baton Rouge, LA-70803 Spatial and temporal variability of sea surface temperature (SST(degree C)) and chlorophyll (mg m-3) obtained from Moderate Resolution Imaging Spectroradiometer (MODIS)-Aqua for the eastern Bering Sea during May, June, July, August, and September for a period of 7 years (2003-2009) was studied using Empirical orthogonal function (EOF) analysis. Monthly composite images of SST and chlorophyll were normalized by subtracting their spatial and temporal means with cloud, land and ice-cover pixels masked out prior to EOF analysis. The monthly composite images of SST and chlorophyll showed distinct temporal and spatial patterns in the eastern Bering Sea during the study period. The SST in eastern Bering Sea showed a transition from a warm period (2003-2005) to cooler period (2006-2009). The first 3 EOF modes of SST were retained as they explained greater than 70% variability with the first SST EOF mode explaining 59.5% of the total variation of SST in the study area during the study period. For the chlorophyll dataset, the first 3 EOF modes explained greater than 55% of the total variance with the first chlorophyll EOF explaining 28.1% of the total variation in chlorophyll in the study area. In order to study the variability SST and chlorophyll with variability in atmospheric forcing in the eastern Bering Sea, the SST EOF modes and chlorophyll EOF modes were studied in relation to May SST Index, Ice Cover Index and Bering Sea Pressure Index (BSPI) during the study period. The decreasing amplitude of first SST EOF and switching from mostly positive to negative amplitude of the third chlorophyll EOF mode in 2006 was consistent with the May SST Index, Ice Cover Index and Bering Sea Pressure Index (BSPI).
25.	Mr. Louis Nguyen *NASA Langley*	Mashup App for Visualization of A-Train Products: Promoting Scientific Mashup	Poster	The development of mashup applications have been more prevalent with the advent of Web 2.0 technologies and standards. Data centers and repositories are publishing data on the World Wide Web (WWW) by varies techniques including XML/RDF formated files. They also provide access to the data via web services by way of application programming interface (API). A select set of A-Train products consisting of Calipso, CloudSat, and CERES, to name a few, are currently accessible on the WWW using Web 2.0 techniques and services. This poster describes how these web-accessible A-Train products and services are merged to create a new web service application commonly referred to as a mashup. Because mashup allows mixing and matching of data products and services, developers can quickly build and customize web mashup app to meet their needs without building existing services or storing data or products. To promote mashup, the scientific community needs to publish products in a RESTful way and provide web service to get at the data. We will present and demonstrate a mashup application to visualize Calipso, CloudSat and CERES products using web services from Google Map and NASA Langley. A discussion on how to publish products, utilize existing services, and build new services will be presented.

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26.	Mr. Emmett Perl *NOAA*	LIDAR studies of Plankton Layering using the CALIPSO Satellite	Poster	For many years, airborne LIDAR has been used to survey plankton concentrations across the globe, giving us an indication of how climate affects ocean life. However, use of a space-based LIDAR would greatly expand the range of these studies. Although the LIDAR on the CALIPSO satellite (CALIOP) was designed primarily to probe the atmosphere, many of its parameters are favorable for making oceanographic measurements. Our group at NOAA explored the feasibility of using CALIOP to find plankton layers in the ocean and determined the limiting factors of the instrument. Furthermore, we have suggestions for future space-based LIDAR systems designed for both atmospheric and oceanographic measurements. In this study, we searched a year's worth of CALIOP data for evidence of plankton layering in the ocean. These layers are revealed through an increase in depolarization of the return LIDAR signal. By taking the median of the signal at the ocean surface (+200 to -300 meters), we were able to reduce the noise in the signal and get a good depth profile. Then, by searching the data, we were able to identify over 1000 possible layers. This shows that space-based LIDAR may be a practical means of identifying sub-surface scattering layers in the oligotrophic ocean. However, the quality of this study was limited by the relatively low range resolution (22.5 meters in water) of the CALIOP instrument. A future space-based LIDAR with improved range resolution would allow for a better survey of worldwide plankton concentrations, giving us a better picture of how climate affects life in the ocean.
27.	Kathryn J Regner *UA-Huntsville AMSR-E SIPS*	Near-Real-Time Availability of AMSR-E Data	Poster	Sponsored by NASA's Earth Science Division, the Land Atmosphere Near real-time Capability for EOS, or LANCE, system comprises five processing elements, collocated with select EOSDIS data centers, that use optimized science algorithms to expedite processing of remotely sensed data and distribution to registered users. Climate research quality data products from Aqua's AMSR-E (Advanced Microwave Scanning Radiometer for Earth Observing System) are generated at the AMSR-E SIPS (Science Investigator-led Processing System), with an average latency of 17-20 hours for swath products. With the implementation of LANCE at AMSR-E SIPS, these products, with noted limitations, are generated with an average latency of less than 3 hours. While not a substitute for research quality products, near real-time products are in high demand in fields such as numerical weather prediction and forecasting, monitoring of natural hazards, disaster relief, agriculture and homeland security. This poster focuses on the AMSR-E SIPS' implementation of LANCE, characterizes the data with respect to the standard products, and provides information on how to obtain LANCE data.

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	Name	Abstract Title	Accepted Abstract Format	Abstract
28.	Dr. Jeffrey S Reid *Naval Research Laboratory*	Operational application of NASA data to aerosol forecasting	Talk	Recently the world's leading operational meteorological and remote sensing centers to discuss the emerging field of operational aerosol forecasting and the observability challenges of the next decade. This meeting was the first ever to combine the lead aerosol developers and remote sensing data providers from around the globe in discussing state-of-the-art technologies and operational requirements for aerosol forecasting. Participants included: operational centers representatives of ECMWF, FNMOC, JMA, NOAA NCEP, and UKMO; remote sensing data providers from EUMETSAT, ESA, JAXA, NASA, NOAA NESDIS, and NPP; and additional developers from NRL, NASA GMAO, NOAA, and several universities. In this talk, we present the findings of this meeting and give an overview of the impact NASA EOS/A-train data has had on operational aerosol forecasting. An overview is given as to what it takes for a product to be effectively used by decision maker. We also present ideas of how operations can help future development of NASA products.
29.	Mr. Francis J Schmidlin *NASA/Goddard Space Flight Center/Wallops Flight Facility*	Satellite And In Situ Measurement Comparability	Poster	Remote measurements of temperature and ozone from AQUA and AURA on the A-Train, and also the SABER instrument on the TIMED satellite are found to be comparable with measurements from in situ instruments. Temperatures from these satellites are comparable to temperatures from the inflatable falling sphere. Although sphere measurements are reliable, the availability of these instruments has become more difficult and, in fact, the falling sphere instrument is no longer manufactured. Presented are two field studies, one from the MaCWAVE mission in 2002 and 2003 and the second from the vicinity of Kwajalein Atoll in 2010, that compare satellite temperature retrievals with each other and with the in situ sphere. Remotely measured temperatures mimic the temperature measurement of the falling sphere quite well. The data also confirm that satellite retrievals, while not always at the exact location required for individual studies, are adaptable enough and highly useful for producing atmospheric temperature profiles. In addition, examination of ozonesonde measurements from Wallops Island, Natal, Brazil, and Ascension Island reveal that, while remote measurements do not contain the structure often seen with the ECC ozonesonde, their overall agreement is excellent.

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	Name	Abstract Title	Accepted Abstract Format	Abstract
30.	William L Smith Jr. *NASA LaRC*	Applications for Climatological Cloud Water Content Profiles Derived from CloudSat Data	Talk	Satellite data are a critical tool for improving the representation of clouds and their effects in weather analyses and forecast models. Cloud parameters derived routinely from meteorological satellite imager data are of sufficient accuracy, have high horizontal and temporal resolution but lack vertical resolution. CALIPSO and CloudSat are providing unprecedented global data describing the vertical structure of cloud systems along the satellite track, but are non-scanning, and by themselves do not provide the 3-dimensional depiction of clouds over large areas needed for a variety of nowcasting and short term weather forecasting applications. Therefore, it is desirable to try and extend the unique information provided by CloudSat and CALIPSO, in time and space, using meteorological satellite data in order to improve the characterization of clouds in 4-dimensions. In the approach taken here, climatological cloud water content (CWC) profiles are derived from CloudSat data for a variety of cloud types. The cloud types are defined by cloud parameters typically retrieved from operational satellite data such as the cloud temperature, cloud water path (CWP), and geometric thickness (DZ). The climatological profiles are used in a retrieval system to derive CWC profiles from operational satellite imager data that are constrained by the retrieved CWP and DZ. The profiling technique is demonstrated over the CONUS using cloud properties derived routinely from GOES data and is tested with independent CloudSat data. The profiling technique is also employed to improve the diagnosis of aircraft icing conditions from GOES data. Because the GOES cloud products can be produced in near real-time, they have potential for assimilation into forecast models provided appropriate assimilation procedures can be developed. Toward that end, cloud analyses and forecasts from the Rapid Update Cycle are also evaluated with the active and passive satellite products from both an instantaneous and climatological perspective.
31.	Joshua Stodghill *DEVELOP National Program*	The Utilization of NASA Satellite Data to Analyze Tropical Cyclone Wind Speed and Cloud Height in the Gulf of Mexico to Assist CHILI in Hurricane Landfall Research	Poster	As tropical cyclones make landfall, most of the immediate structural damage is caused by strong winds. Instruments such as anemometers, thermometers, and barometers on buoys in the Gulf of Mexico provide real-time data as a storm approaches land. Unfortunately, these instruments often fail in extreme weather conditions such as high wind velocities. In hurricane research, satellite data can be utilized to supplement this data. Several satellite instruments monitor wind speed and direction. This project utilized the Advanced Microwave Scanning Radiometer-EOS (AMSR-E) aboard the NASA Aqua satellite and the SeaWinds instrument aboard the NASA QuikSCAT satellite to monitor wind speed and direction of select storms that tracked through the Gulf of Mexico between 2002 and 2009. Ancillary wind speed data was retrieved from the National Data Buoy Center (NDBC). Satellite and buoy data were compared to assess strengths and limitations of each data type. Cloud height data in six storms from 2006 to 2009 was obtained from the Cloud Profiling Radar (CPR) instrument aboard the NASA CloudSAT satellite. Correlation between cloud heights and wind speed was assessed. A methodology for satellite data acquisition, processing, and analysis was produced to be utilized by the Center for Hurricane Intensity and Landfall Investigation (CHILI) and the National Data Buoy Center (NDBC) in future research. Wind vector maps and cloud height imagery were produced. Visualizations were formatted for HIVE (Highly-portable Immersive Virtual Environment) viewing.

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32.	Jim Szykman *US EPA, Office of Research and Development*	The Use of A-Train data sets via the EPA Remote Sensing Information Gateway (RSIG)/3-D Air Quality System (3-D AQS) for CMAQ Evaluation	Talk	The Environmental Protection Agency (EPA) Remote Sensing Information Gateway (RSIG) was developed as a prototype system under the EPA-GEO (Global Earth Observations) Advance Monitoring Initiative (AMI) to demonstrate the ability to share and integrate Earth observation data with partners at National Aeronautics and Space Administration (NASA) and National Oceanic and Atmospheric Administration (NOAA) using a distributed architecture. Similarly, the NASA-EPA 3-D Air Quality System decision support project was focused on improved access to NASA satellite data for the air quality community. In 2008, the EPA subsumed the goals and objectives of the 3-D AQS project under the development of the RSIG. EPA's Remote Sensing Information Gateway is now an operational web-based tool (www.epa.gov/rsig) that enables users to access a variety of distributed environmental datasets, including 3-dimenional air quality data sets in a highly efficient manner. Satellite data sets available via RSIG include Moderate Resolution Imaging Spectroradiometer (MODIS) aerosol optical depth and cloud optical thickness along with Cloud-Aerosol Lidar with Orthogonal Polarization (CALIOP) total aerosol backscatter, key A-Train data relevant to air quality research and analysis. The RSIG/3-D AQS system: • Provides a common operational framework for the visualization and analysis of relevant air quality related data. • Provides users the ability to integrate various data sets across different time and space scales. • Extends access and increases usage of air quality relevant aerosol satellite data into EPA applied research and applications; and • Is a sustainable system with the flexibility to add additional relevant satellite and non-satellite data sets and applications to support EPA and decision-making activities as well as the needs of partner organizations and other users. The RSIG/3-D AQS system also provides the user with the ability to grid Level 1 and Level 2 satellite data onto several regional to hemispheric grid domains used by US EPA's Community Multi-scale Air Quality (CMAQ) modeling system. The CMAQ modeling system is a multi-pollutant 4-D modeling system used for a variety of assessments to support implementation of the National Ambient Air Quality Standards (NAAQS) as well as policy issues on visibility degradation, acid deposition, and atmospheric loading of nutrients to sensitive ecosystems at multiple time and space scales. This presentation will provide an overview on how RSIG works along with several examples of how EPA is using MODIS and CALIOP data for evaluation of CMAQ at different modeling scales.

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	Name	Abstract Title	Accepted Abstract Format	Abstract
33.	Dr. Michael Teague *NASA Goddard Space Flight Center / Sigma Space*	The use of Terra and Aqua MODIS data to generate Near-Real Time Data Products and Imagery	Poster	GSFC ESDIS and the Terrestrial Information Systems Branch (6145) operate the Land and Atmospheres Near-real-time Capability for EOS (LANCE-MODIS) system. Other LANCE elements include –AIRS, -MLS, -OMI, and –AMSRE. LANCE-MODIS incorporates the former Rapid Response system and will, in early 2011, include the Fire Information for Resource Management System (FIRMS). The purpose of these systems is to provide applications users with a variety of products on a near-real time basis. The LANCE-MODIS data products include Level 1 (L1), L2 fire, snow, sea ice, cloud mask/profiles, aerosols, cloud, land surface temperature, and L2G and L3 gridded, daily, land surface reflectance products. Data are available either by ftp access (pull) or by subscription (push) and the L1 and L2 data products are available within an average of 2.5 hours of the observation time. The http://lance.nasa.gov site provides registration information and extensive information concerning the MODIS data products and imagery. The LANCE-MODIS system includes a variety of tools that enable users to manipulate the data products including: parameter, band, and geographic subsetting, re-projection, mosaicing, and generation of data in the GeoTIFF format. In most instances the data resulting from use of these tools has a latency of less than 3 hours. LANCE-MODIS supports a wide variety of applications users in civilian, military, and foreign agencies as well as universities and the private sector LANCE-MODIS generates a variety of imagery included browse images for the listed data products. Since 2001, NASA's MODIS Rapid Response Project has been providing fire detections and imagery in near real time for a wide variety of application users. The web site provides MODIS imagery in true color and false color band combinations, a vegetation index, and temperature – in both uncorrected swath format and geographically corrected subset regions within a few hours of data acquisition. The uncorrected swath format data is available worldwide. A wide range of user communities access this information to get a rapid, 250 meter-resolution overview of ground conditions for fire management, crop and famine monitoring and forecasting, disaster response (floods, storms), dust and aerosol monitoring, aviation (tracking volcanic ash), monitoring sea ice conditions, environmental monitoring, and more. FIRMS uses GIS technology to deliver timely information on forest, grassland and agricultural fires to natural resource managers and other stake holders in over 100 countries. FIRMS provides MODIS hotspot/fire information through email alerts, interactive WebGIS (Web Fire Mapper), data downloads (shapefiles, textfFiles, KML/Google Earth, WMS), and subsets of MODIS images. FIRMS also provides a MODIS hotspot archive download tool and visualization of the MODIS Burned Area product. These services provide earlier warnings of large fires that warrant management response and more accurate fire locations, and a better connection between fire management and conservation programs that now use FIRMS data to detect illegal clearings of land in protected areas.

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	Name	Abstract Title	Accepted Abstract Format	Abstract
34.	Mr. Virendra Thanvi *SGT, Inc.*	Implementing Land and Atmosphere Near Real-Time Capability for EOS (LANCE)	Poster	The past decade has seen a rapid increase in availability and usage of near real-time data from sensors on board the earth observing satellites. NASA's Earth Observing System Data and Information System (EOSDIS) provides a wealth of data and products supporting scientific research of the atmosphere, oceans, and land. The Earth Observing System (EOS) instruments onboard Terra, Aqua and Aura satellites make global measurements daily which are processed into higher-level "standard" products within 8 to 40 hours of observation and then made available to users, primarily earth science researchers. However applications users, operational agencies, and even researchers desire EOS products in near real-time to support research and applications, including numerical weather and climate prediction and forecasting, monitoring of natural hazards, ecological/invasive species, agriculture, air quality, disaster relief and homeland security. These users usually need data within 3 hours, and are willing to trade science product quality for timely access. In response to this need, NASA developed the Land, Atmosphere Near Real-time Capability for EOS (LANCE) that provides land and atmosphere data acquired by AIRS, AMSR-E, MLS, MODIS, and OMI instruments.
35.	Dr. Kunhikrishnan Thengumthara *ESSIC, University of Maryland Research Park (M-Square)*	Monitoring dust storms and regional air quality from space: Synergetic use of observations from multiple satellites, ground measurements and model simulations	Talk (Withdrawn)	This study demonstrates the potential of using complimentary satellites derived aerosol parameters from MODIS, MISR and OMI along with a regionally tuned WRF model to track the onset and evolution of dust storms and air quality over the United Arab Emirates (UAE). The Middle East is one of the few regions in the world where dust related extreme events are predominant. Dust emissions from distant and regional sources are obtained from a global and a simple dust model to analyze the transport in terms of aerosol distribution and characteristics obtained from MODIS and AERONET for 2007-08. The correlation between PM10 and AOD over the UAE is found to be inconsistent, varies in space and time. Generally, higher correlations (>0.5) are noted for MISR than that for MODIS. Aerosol indices from OMI are the better tool to monitor the absorbing aerosols such as mineral dust and their long-range transport through synoptic and mesoscale systems. After comparing the observed visibility and PM10 from ground measurements, we found that aerosol parameters from multiple satellites can be used to monitor dust events and provide meaningful indicators of regional air quality and climate. However uncertainties with high albedo, missing data and reduced sensitivity to surface aerosols due to plumes aloft are noted for this desert region.
36.	Mr. Charlie J Tomlinson *University of Birmingham*	Using MODIS land surface temperature to study the urban heat island effect for climate change adaptation	Poster (Withdrawn)	This poster details ongoing research that is combining the remotely sensed MODIS land surface temperature product with ground based meteorological measurements in order to measure the urban heat island effect of Birmingham, UK, at a higher spatial resolution than possible without MODIS data. The results are being used within the rapidly growing climate change adaptation field as part of a heat risk study, and as a verification technique for urban heat island modelling.

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	Name	Abstract Title	Accepted Abstract Format	Abstract
37.	Courtney Weeks *National Center for Atmospheric Research*	Application of MET for the Verification of the NWP Cloud and Precipitation Products using A-Train Satellite Observations	Poster	Application of MET for the Verification of the NWP Cloud and Precipitation Products using A-Train Satellite Observations Courtney Weeks, Paul A. Kucera, Barbara Brown, and Randy Bullock National Center for Atmospheric Research Boulder, CO, USA The goal of this study is to demonstrate the usefulness of the NCAR Model Evaluation Tools (MET) applied to the verification of NWP cloud and precipitation products using high-resolution A-Train satellite observations. MET has been developed to support the Developmental Testbed Center (DTC) at NCAR and has been integrated into community release of the Weather Research and Forecasting (WRF) system. The primary objective of MET is to provide users tools for forecast verification. MET provides grid-to-point, grid-to-grid, and advanced spatial verification techniques in one unified, modular toolkit that can be applied to a variety of spatial fields (e.g., comparison of NWP precipitation estimates with satellite observations). Most verification studies rely on the use of standard verification measures (mean error, bias, mean absolute error, and root mean squared error, etc.) to quantify the quality of the forecasts. Often these measures indicate poorer performance because, among other things, they are unable to account for small-scale variability or discriminate types of errors such as displacement in time and/or space (location, intensity, vertical structure, and orientation errors, etc.) in spatial fields such as precipitation forecasts. This issue has motivated recent research and development of many new spatial verification techniques such as, but not limited to, scale decomposition, fuzzy logic, and object orientated methods. NCAR has been developing a spatial verification tool that has been incorporated into MET called Method for Object-based Diagnostic Evaluation (MODE). We have been developing additional capabilities of MET to evaluate NWP products in the vertical using swath or curtain data from A-Train satellite observations such as CloudSat, MODIS, and TRMM. The enhancements that are being developed will match fields from NWP products with satellite observations and compare similar attributes such as vertical structure, cloud top height, and cloud base height. The initial development has focused on applying the tool to CloudSat observations. However, it will be extended to TRMM, MODIS, and other satellite datasets. The presentation will give a summary of MET and object-based verification tools. We plan to demonstrate the enhancements of MET and the use of object-based verification using several selected CloudSat cases.

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38.	Dr. Banghua Yan *NOAA/NESDIS/OSDPD*	Status and Prospective of NOAA Operational Ocean Color Product System	Talk	The status and future of the NOAA CoastWatch Okeanos operational ocean color product system are summarized in this paper. In recent years, the NOAA CoastWatch Okeanos system has been providing a series of high quality ocean color operational products for our user communities, e.g., 1 km daily and bi-monthly mean chlorophyll concentrations, and chlorophyll concentration anomaly compared to 61-day averages from SeaWiFS, MODIS/AQUA, and MERIS (see http://www.osdpd.noaa.gov/ml/ocean/index.html). The 1 km daily, bi-monthly, and anomaly products of remote sensing reflectance at 667 nm are also available for MODIS/AQUA (and SeaWiFS at 670 nm). These products have been beneficial in assessing water quality and tracking potentially harmful algal blooms in order to protect public health. For example, the chlorophyll concentration product has been used to understand and predict the harmful algal blooms in the Gulf of Mexico by the NOAA Center for Operational Oceanographic Products and Services (CO-OPS). Recent efforts also continue to improve the performance of MODIS/AQUA ocean color products. The higher resolution (0.25 or 0.5 km) MODIS ocean color operational products will be available in late 2012, which cover these CoastWatch regions: Chesapeake Bay, Puerto Rico, Southern California, Mississippi Delta, Texas Coast, and Florida Shelf. Frontal information from MODIS/AQUA chlorophyll data will be used to provide fundamental information needed for ecosystem-based fishery management. The chlorophyll frontal operational products are expected to be available in late 2011 or early 2012. Operational products of Global Emiliania huxleyi bloom distribution will become available late 2011. The improved MODIS ocean color products in US coastal waters using shortwave infrared bands (SWIR) (Wang, 2007) method are expected to be available early 2012. Therefore, it is expected that our future operational ocean color product system offers more valuable information for federal, state, and local marine scientists, as well as coastal resource managers and fisheries managers.
39.	Lihang Zhou *NOAA/NESDIS*	NPOESS Preparatory Project Validation Program for the Cross-track Infrared Sounder	Poster	The National Joint Polar Satellite System (JPSS) Program, in partnership with National Aeronautical Space Administration (NASA), will launch the NPOESS Preparatory Project (NPP), a risk reduction and data continuity mission, prior to the first operational NPOESS launch. The NOAA/NESDIS Center for Satellite Applications and Research (STAR) will execute the NPP Validation program in collaboration with subject matter experts from the user communities to ensure the data products comply with the requirements of the sponsoring agencies. The Cross-track Infrared Sounder (CrIS) and the Advanced Technology Microwave Sounder (ATMS) are two of the instruments that make up the suite of sensors on NPP. Together, CrIS and ATMS will produce three Environmental Data Records (EDRs) including the Atmospheric Vertical Temperature Profile (AVTP), Atmospheric Vertical Moisture Profile (AVMP), and the Atmospheric Vertical Pressure Profile (AVPP). The AVTP and the AVMP are both JPSS Key Performance Parameters (KPPs). The validation plans establish science and user community leadership and participation, and demonstrated, cost-effective Cal/Val approaches. This presentation will highlight pre-launch activities and provide an overview of the collaborative data, techniques, and schedule for the validation of the NPP CrIS and ATMS environmental data products.

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Category: weather and operational applications

	Name	Abstract Title	Accepted Abstract Format	Abstract
40.	Lihang Zhou *NOAA/NESDIS*	Ocean Data Products from the Visible Infrared Imager Radiometer Suite(VIIRS) NPOESS Preparatory Project Validation Program	Poster	Present pre launch activities for the Calibration and Validation for VIIRS are in development to provide operational "ocean products". Data from VIIRS will produce Environmental Data Records (EDR's) of Ocean Color/Chlorophyll and Sea Surface Temperature as part of the Joint Polar Satellite System (JPSS) Program. Efforts are directed providing operational capability quickly following launch. Current prelaunch activities highlight include: 1. Real time VIIRS proxy data from MODIS - presently ongoing 2. Real time Vicarious Calibration methods - Extensions of MOBY data and M-AERI 3. Insitu data programs - AERONET -Ocean Color sites and M-AERI data collections 4. Insitu match-up protocols for spatial and temporal uncertainty analyses 5. Inter-satellite comparisons of EDR products. - MODIS, SeaWIFS, MERIS, AVHRR, METOP The ocean validation program is designed to address an "end to end" capability from sensor to end product which is based on ongoing capabilities currently in use with NASA research and Navy and NOAA operational products. This presentation describes the progress, approaches, data availability and schedule for the validation of VIIRS Ocean environmental data products. NOAA/NESDIS Center for Satellite Applications and Research (STAR) in partnership with National Aeronautical Space Administration (NASA) is coordinating the cal val efforts to insure products comply with requirements of sponsoring agencies.